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DUNE as an ultra-light dark matter detector

So little is known about the nature of the dark sector of our universe. An interesting and viable possibility that may explain some cosmological puzzles is that dark matter consists, at least in part, of an ultra-light scalar with mass much below the electronvolt scale (sometimes called Fuzzy Dark Matter). If this field couples to standard model particles, it may induce time dependency of their masses. Since neutrinos are so light, this effect could be particularly important for oscillations and the generation of neutrino masses. We analyze how neutrino experiments, in particular DUNE, can probe this exciting scenario via oscillation measurements.

Mini-abstract

DUNE can probe ultra-light scalars via signal time modulation or distorted neutrino oscillations.

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